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Selected US specifications from IPC sub-class A01K

(54) Animal feed dispenser

(57) The dispenser 1 enables dispensing of a range of feed types adapted to different stages in the growing process of an animal, using only two or three basic feed types. The basic feed types are supplied from hoppers 4 and 5 to a feed trough 2 by way of an adjustable proportioning mechanism 16, 17 for adjusting the relative proportions of the basic feed types supplied and a mixing mechanism 33 for mixing the basic feed types together. Various particular features of preferred embodiments are disclosed.

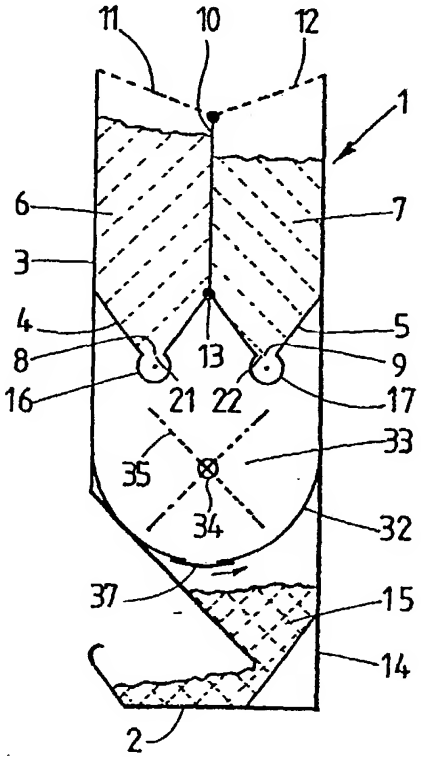

Fig.1.

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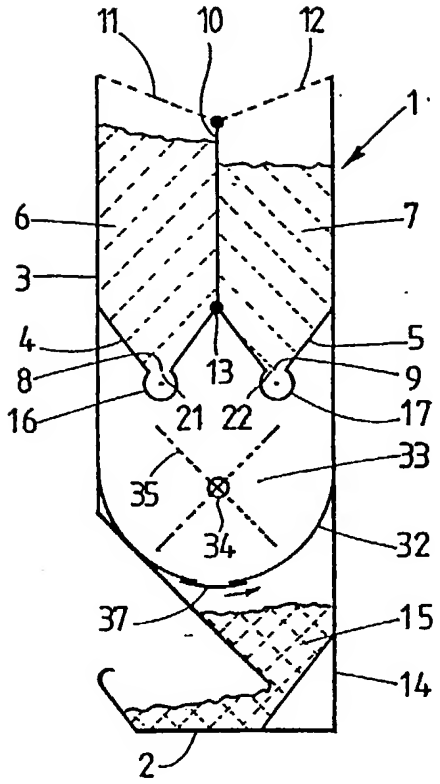
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Fig.1.

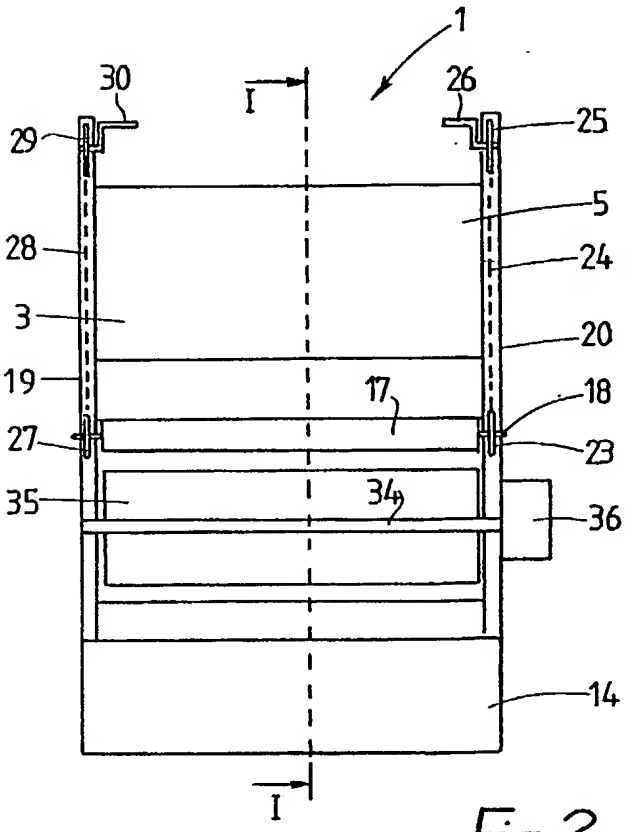
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Fig.2.

SPECIFICATION

Animal feed dispenser

This invention relates to dispensers for animal feed for use in the feeding of livestock.

A known feed dispenser for pigs comprises an integral trough and hopper and is of the so-called ad libitum type in that there is no restriction on the amount of feed which may be taken from the trough by a pig since the trough will be automatically replenished from the hopper under the effect of gravity. Such dispensers are preferably filled with a different feed according to the growth requirements of the pigs so that typically feeds of five different compositions may be supplied to a pig at different stages during its growth cycle in order to optimise growth of the various tissues in accordance with the farmer's requirements.

In order to be able to precisely control the actual pig growing process from weaning through to slaughter, it is accordingly desirable that the farmer should keep five or more different feed types in stock at all times and should supply these feeds to each batch of pigs at the appropriate times. Generally the more feed types which are used, the greater the control of the growing process. However it is impracticable for a farmer to stock more than a certain number of feed types, and similarly for the feed supplier to manufacture more than a certain number of feed types.

It is an object of the invention to provide a novel form of feed dispenser which enables the number of feed types stocked to be decreased without adversely affecting the growing process.

According to the invention there is provided a feed dispenser comprising a plurality of feed containers each provided for containing feed of a different type and each incorporating a respective outlet, a receptacle for receiving feed from the outlet of each feed container, and proportioning means for controlling the supply of feed to the receptacle so as to determine the relative proportions of the different feed types received by the receptacle from the feed containers.

Such a dispenser enables feeds of two different types, for example, to be mixed so as to produce a feed of a third type, and therefore provides a means by which the number of feed types actually supplied to an animal may exceed the actual number of feed types stocked. It should be understood that it is not essential for the mixed feed type to be a homogenous mix of the constituent feed types, as the nutritional effect on the animal will be the same whether or not the constituent feed types are well mixed.

Preferably the proportioning means is adjustable so as to vary the relative proportions of the different feed types received by the receptacle. This enables different settings of the proportioning means to be used for producing different mixtures of feed types using the same constituent feed types, so that a whole range of feed types sufficient to control the whole growing process of the animal may be supplied using only two or three basic feed types.

The receptacle may be a trough from which the animal feeds directly or part of a conveyor for conveying the feed from the dispenser to a feeding point. For example, in an arrangement for feeding growing poultry, the feed may be supplied from the dispenser to a closed-loop feed conveyor, and from there the feed may distributed to the birds positioned along the conveyor run.

The proportioning means may comprise, for example, respective cylindrical rollers associated with each container outlet and rotatable about their longitudinal axes so as the controllably dispense feed from the outlets. Each roller may include a recess which is capable of being supplied with feed from the associated container outlet when in a first angular position and which is capable of discharging said feed into the receptacle when in a second angular position. Adjustment of the relative proportions of the different feed types discharged may be provided by varying the relative number of rotations of the rollers or by varying the relative sizes of openings through which feed is supplied to the recesses in the rollers.

In order that the invention may be more fully understood, a preferred embodiment of feed dispenser in accordance with the invention will now be described, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a schematic section through the dispenser taken along the line I-I in Figure 2; and

Figure 2 is a rear view of the dispenser.

The dispenser 1 illustrated in the drawing is provided for mixing two feed types in determined proportions so as to produce a mixture for feeding to pigs which can be varied by varying the relative proportions of the constituent feed types. The dispenser 1 comprises an integral trough 2 and hopper assembly 3. The hopper assembly 3 incorporates two containers in the form of hoppers 4 and 5 for containing quantities 6 and 7 of first and second feed types. Each of the hoppers 4 and 5 has a respective outlet 8 or 9 at its lowest point. The hoppers 4 and 5 are separated by a central partition 10, and a top flap is hinged on the central partition 10 and is pivotal between two positions 11 and 12 (shown in broken lines in Figure 1) to facilitate filling of the hoppers 4 and 5 with different feed materials. The central partition 10 is additionally pivoted at a point 13, and the top of this partition 10 may be fixed in a number of positions by slotting bolts into the side of the hopper assembly 3 in order to vary the relative sizes of the hoppers 4 and 5 in dependence on the relative quantities of the two feed types which it is required to store in the hoppers 4 and 5.

Beneath the outlets 8 and 9 of the hoppers 4 and 5 is a feed chamber 14 which is shown in Figure 1 as containing a quantity 15 of feed material containing quantities of the first and second feed types. This chamber 14 leads to the trough 2, and the trough 2 is automatically replenished with feed material from the chamber 14 as necessary.

The dispenser 1 also incorporates a proportioning mechanism comprising two metering tubes 16

and 17 each of which is arranged adjacent a respective one of the hopper outlets 8 and 9. Each of the metering tubes 16 and 17 is hollow, and both tubes 16 and 17 have the same internal and external dimensions. Furthermore each metering tube 16 or 17 is provided with stub axles such as 18 (see Figure 2) at its two ends, and the axles are supported by rigid frame members 19 and 20 on either side of the hopper assembly 3 so as to maintain the longitudinal axes of the metering tubes 16 and 17 horizontal and parallel to one another and so as to enable these tubes 16 and 17 to rotate about their axes.

In addition each metering tube 16 or 17 is provided with a lengthwise slit 21 or 22 of width similar to the width of the outlet 8 or 9 at the bottom of each hopper 4 or 5. Thus, when one of the metering tubes 16 or 17 is positioned in an angular position such that its lengthwise slit 21 or 22 is in register with the associated hopper outlet 8 or 9, feed material may be supplied from the associated hopper 4 or 5 to the hollow space within the tube 16 or 17. Furthermore, when the metering tube 16 or 17 is subsequently rotated through 180° to an angular position in which the slit 21 or 22 opens vertically downwards, the feed material previously supplied to the space within the tube 16 or 17 may be discharged into a mixing chamber 32. Thus it will be appreciated that feed material may be supplied from each of the hoppers 4 and 5 to the mixing chamber 32 by rotating the associated metering tube 16 or 17 from a position in which the slit 21 or 22 opens vertically upwards to a position in which the slit 21 or 22 opens vertically downwards. The rate at which feed material is supplied from one of the hoppers 4 or 5 will depend on the number of times in which the associated metering tube 16 or 17 is rotated in a period of time. Clearly, therefore, the relative proportions of the two feed types supplied to the mixing chamber 32 will depend on the relative number of times that the metering tubes 16 and 17 are rotated in the same period of time, and these proportions may be varied by varying the number of rotations applied to the metering tubes 16 and 17.

Within the mixing chamber 32 is a paddle mixer 33 comprising a horizontal rotary shaft 34 and four radially and axially extending vanes 35. The shaft 34 is rotatable by means of an electric motor 36 (see Figure 2) so as to mix the different feed types supplied to the mixing chamber 32, prior to the resultant mixture being discharged to the feed chamber 14 by opening of an outlet trap 37.

Referring to Figure 2, a mechanism is provided for rotating the metering tube 17 which comprises a sprocket 23 fixed on the stub axle 18 at one end of the tube 17 and an endless chain 24 which is wrapped around this sprocket 23 and a further sprocket 25 mounted at the top of the frame member 20. A winding handle 26 is provided for turning the sprocket 25, this rotation being transmitted to the sprocket 23 by way of the chain 24 and thus causing rotation of the metering tube 17. A similar arrangement is provided for rotating the metering tube 16 (not visible in Figure 2) on the opposite side of the hopper assembly 3. This arrangement comprises a sprocket 27, an endless chain 28, a sprocket 29 and a winding handle 30.

Supply of feed of the first and second types to the mixing chamber 32 and hence to the feed chamber 14 in the required proportions may therefore be achieved by turning the winding handle 26 an appropriate number of times and subsequently turning the winding handle 30 an appropriate number of times, the ratio of the number of times that the two handles 26 and 30 are turned determining the relative proportions of the first and second feed types in the feed mixture actually supplied to the pigs, assuming that all sprockets 23, 25, 27 and 29 are of the same diameter and tooth pitch. When the required proportions of feed material have been supplied to the mixing chamber 14, the material is mixed by operating the motor 36 and, after mixing, the material is discharged to the feed chamber 14 by manually opening the outlet trap 37.

A number of alternative arrangements are possible for the proportioning mechanism. For example, electrical drive motors and associated circuitry may be provided for rotating the metering tubes 16 and 17, and the drive circuitry could include programming means capable of being programmed to rotate the metering tubes 16 and 17 at the required rates to obtain the necessary proportioning of the first and second feed types. In another arrangement the metering tubes may be replaced by solid rollers which are spaced from the outlets by a short distance so that feed material is carried round on the outer surface of the rollers as they rotate. In a still further arrangement adjustability of the proportioning of the feed types is obtained by varying the size of the slit in each tube or the size of the outlet of each hopper, rather than by varying the rate of rotation of the tubes. In another arrangement the metering tubes are replaced by pivotally mounted holders each of which comprises two open-topped chambers. When one of these chambers is filled with feed material from the associated hopper outlet up to a certain weight, the holder tips to discharge the material from the chamber and to bring the other chamber beneath the hopper outlet. The other chamber is then filled with feed material up to a certain weight when the holder tips in the opposite direction to empty that chamber and bring the first chamber beneath the hopper outlet again. The rate at which feed material is supplied to the holders may be varied by varying the size of the hopper outlets.

Furthermore, in each of the above-described arrangements, a respective counter may be associated with each metering tube or other proportioning means so as to record the number of rotations of the tube and hence the quantity of feed material supplied from each hopper.

The above-described dispensers are essentially controlled gravity-flow dispensers and may be used either as ad libitum feeders or restricted feeders. They provide the ability to produce a whole range of feeds of different nutritional consistency adapted to various stages in the pig growing cycle

using only two or three separate compounded feeds mixed in varying proportions.

In an alternative embodiment of the invention, the sprockets 23, 25, 27 and 29 and the chains 24 and 28 are replaced by pulleys and V-belts.

CLAIMS

1. A feed dispenser comprising a plurality of feed containers, each provided for containing feed of a different type and each incorporating a respective outlet, a receptacle for receiving feed from the outlet of each feed container, and proportioning means for controlling the supply of feed to the receptacle so as to determine the relative proportions of the different feed types received by the receptacle from the feed containers.

2. A feed dispenser according to claim 1, further comprising mixing means for mixing together the different feed types supplied to the receptacle from the feed containers.

3. A feed dispenser according to claim 2, wherein the mixing means comprises a paddle mixer arranged to receive the proportions of the different feed types supplied from the feed containers under control of the proportioning means.

4. A feed dispenser according to claim 1, 2 or 3, wherein the proportioning means is adjustable so as to vary the relative proportions of the different feed types received by the receptacle.

5. A feed dispenser according to any preceding claim, wherein the receptacle is a trough from which an animal may feed directly.

6. A feed dispenser according to any one of claims 1 to 4, wherein the receptacle is part of a conveyor for conveying the feed from the dispenser to a feeding point.

7. A feed dispenser according to any preceding claim, wherein the proportioning means comprises a respective cylindrical roller associated with each container outlet and rotatable about its longitudinal axis so as to controllably dispense feed from the outlet.

8. A feed dispenser according to claim 7, wherein each roller includes a recess which is capable of being supplied with feed from the associated container outlet when in a first angular position and which is capable of discharging said feed into the receptacle when in a second angular position.

9. A feed dispenser according to claim 2 or any one of claims 3 to 8 when appended directly or indirectly to claim 2, further comprising drive means for driving the mixing means.

10. A feed dispenser substantially as hereinbefore described with reference to the accompanying drawing.

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